

Steps Toward an EOS-Era Aerosol Type Climatology

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We still have a way to go to develop a global climatology of aerosol type from the EOS-era satellite data record that currently spans more than 12 years of observations. We have demonstrated the ability to retrieve aerosol type regionally, providing a classification based on the combined constraints on particle size, shape, and single-scattering albedo (SSA) from the MISR instrument. Under good but not necessarily ideal conditions, the MISR data can distinguish three-to-five size bins, two-to-four bins in SSA, and spherical vs. non-spherical particles. However, retrieval sensitivity varies enormously with scene conditions. So, for example, there is less information about aerosol type when the mid-visible aerosol optical depth (AOD) is less than about 0.15 or 0.2, or when the range of scattering angles observed is reduced by solar geometry, even though the quality of the AOD retrieval itself is much less sensitive to these factors.

This presentation will review a series of studies aimed at assessing the capabilities, as well as the limitations, of MISR aerosol type retrievals involving wildfire smoke, desert dust, volcanic ash, and urban pollution, in specific cases where suborbital validation data are available. A synthesis of results, planned upgrades to the MISR Standard aerosol algorithm to improve aerosol type retrievals, and steps toward the development of an aerosol type quality flag for the Standard product, will also be covered.